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COVID-19 AS A STRESS TEST OF HEALTHCARE ESTABLISHMENTS EFFECTIVENESS AND RELIABILITY MEASURED NATIONALLY AND GLOBALLY

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ABSTRACT

The aim: The authors aimed to estimate the healthcare environment risks and safety problems of the medical staff and patients, methods of neutralizing the negative public health effects and to suggest the new approaches to improved effectiveness and reliability of the healthcare establishments functioning under the emergencies.

Materials and methods: The study includes data of questioning of 163 healthcare workers of certain institutions in Ukraine using the questionnaire of the Agency for Healthcare Research and Quality (the USA) on adherence to the patients' safety culture. In this study only the data on the patients' safety culture "response to mistakes" are represented. The more positive answers the respondents gave, the less they are aware that their mistakes and reports do not influence them negatively.

Results: Hospital environment represents a complex multi-component system, in which specific medical and social tasks are executed, with their fulfillment accompanied with hazardous and unsafe biological, psycho-physiological, chemical, physical and social effects on the staff, patients and the environment. The joined effect of the hospital environment negative factors on the staff is stipulated for the stress and functional tiredness accumulation; it leads to increase in medical mistakes occurrence, which, in its turn, increases probability of occupational catching COVID-19, thus, raising the hospital environment risks under the COVID-19 circumstances both for the medical staff and the patients.

Conclusions: The COVID-19 pandemics turned to be a helpful factor to define critical issues in the hospital environment safety, proving the necessity of further studies, aimed at transforming the safe hospital environment notion from its theoretical meaning into the working paradigm, minimizing practical risk in hospital establishments.

KEY WORDS: COVID-19, hospital environment safety, safety culture, hospital environment risks

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INTRODUCTION

Healthcare institutions, in which human lives and health are saved, are not as safe as they may seem. Healthcare branch is one of the most hazardous in the USA by non-lethal opportunistic injury rate [1]. The healthcare workers life duration due to dangerous, hard and stressful working conditions is on average shorter than that of other citizens [2-3]. It is only in single economically developed countries that the medical staff average life duration is the same as that of the population [4].

Each tenth patient in the in-patient department has been accidentally endangered during his medical servicing. Due to the medical staff mistakes and other preventable incidents, two million six hundred thousand patients die annually in countries with low and average income level. Among the other factors, fear of reporting mistakes in hospital institutions as a consequence of unfair depressive culture inhibits the progress and training aimed at staff actualization and prevention of mistakes [5].

Risks, severity and stressfulness of the healthcare work increases abruptly under the conditions of medical and biological emergencies. Medical workers were the first to face the COVID-19 pandemics danger [6]. In case of infectious epidemics not only the staff of certain medical departments, but of whole hospitals may be affected, which brings considerable difficulties in providing healthcare to the local societies [7-8].

These tragedies are represented not only with the human, financial and other losses, but as the turning points in certain branches progress as well as human progress at all. For example, analysis of the atomic nuclear power station "Three-mile island" (the USA) 1979 accident causes led to introduction of such important safety principle as the human factor, and the unbiased analysis of the 1986 Chernobyl atomic nuclear power station provided humanity with the global safety principle – safety culture. Nowadays these principles underlie the safety basis not only in the nuclear sphere [9], but almost in all human activity spheres.

The stress-tests, developed and held in the atomic power stations after the “Fucushima-1” accident, resulted in positive consequences for the power stations safety, including the Ukrainian ones [10].

On the other hand, evidences show that informational silence and superficial approach to the accident results in the new similar ones [11].

Nowadays, under the COVID-19 pandemics, despite tremendous human and economic losses, caused by it, the priority attention is paid to the re-interpretation of the political directions aimed at prevention of similar pandemics in the future [12].

The COVID-19 pandemics should be regarded as a stress-test for the global healthcare and humanity, concentrating not on the missed opportunities, but the new impulses [13]. The consequence of such position among the others should be new approaches to the hospital environment safety.

THE AIM

The authors aim to estimate the healthcare safety problems manifested during the COVID-19 pandemics and to suggest new approaches to improved safety and reliability of the healthcare institutions.

MATERIALS AND METHODS

The study includes data of questioning of 163 healthcare workers of certain institutions in Ukraine using the questionnaire of the Agency for Healthcare Research and Quality (the USA) on adherence to the patients’ safety culture [14]. In this study only the data on the patients’ safety culture “response to mistakes” are represented. The more positive answers the respondents gave, the less they are aware that their mistakes and reports do not influence them negatively.

The authors have reviewed and analyzed Ukrainian standard legislative documents on the healthcare service provision and control, as well as the papers of Ukrainian and foreign authors dedicated to the patients’ safety. The annual reports on the healthcare in Ukraine by State Institution “Center of Medical Statistics of Ministry of Health of Ukraine” and the statistical reports of the State Statistical Service of Ukraine, dedicated to occupational injury rates, have been analyzed; as well as the WHO data and operational information of the State Service of Labour Protection.

The authors used the following methods: bibliosemantic, questionnaire, hygienical, statistical and mathematical methods.

RESULTS AND DISCUSSION

Even in 2019, under the COVID-19 pandemics emergence (fig.1), the occupational injury rate in Ukrainian healthcare and Social service branch was rising. Compared to 2019, when 286 official employees were injured performing their

professional duties, the value increased in 2020 by more than 10 times, reaching 3288 people. The same changes are observed with the mortal injury rate: from 7 people in 2019 to 79 people in 2020. Here the rise occurs mostly due to increase in the healthcare branch victims, where the mentioned values in 2020 made up 3238 and 68 people respectively.

The hazardous medical staff labour conditions reflected negatively on their professional performance. Figure 2 demonstrates not only increase in the in-patient adult mortality rate (from 1.72% to 2.90%), which turned out to be the most susceptible to the SARS-CoV-2. Similar dramatic increase trends in 2020 compared to 2019 were characteristic for the general children in-patient mortality rate (from 0.18% to 0.29%) and mortality rate of the children under 1 year (from 0.93% to 1,28%). Postoperative mortality in Ukrainian in-patient departments has also significantly increased (from 0.58% to 0.75 %).

This generally confirms the WHO statement that one cannot provide for the patients’ safety without safe medical personnel labour conditions.

This proves that the COVID-19 pandemic has become a peculiar stress-test, which detected problems in the healthcare safety branch, the problems requiring for the thorough studies with further elimination of the problems causes.

Nowadays, no accurate statistical data on the 2020 occupational injury rate in various branches of Ukraine, including the healthcare, are available. As for the previous years (2006-2018), the prevailing were accidents due to poor organization and psychophysiological causes, i.e. human factor (Fig.3).

All the described above calls for attention paid to the organization culture and safety culture in Ukrainian healthcare establishments as effective instruments of the safety-centered human values mobilization. Unfortunately, the country experiences difficulties with safety culture in the healthcare branch.

The results of questioning on the safety culture adherence in Ukrainian healthcare institutions regarding the “Response to mistakes” are provided as follows (Fig. 4): the Ukrainian medical staff, like their colleagues in the other countries of the CIS [15] and the USA [16], gave less than 50% positive answers regarding the characteristics “Response to mistakes”, with this parameter characterizing weakness of the safety culture. The only exception is the medical personnel of Sweden healthcare institutions [17], as for the respondents the “Response to mistakes” was their strong safety culture side. In Ukraine the value was only 30%.

I.e., the majority of medical staff, particularly in Ukraine, is afraid of disclosing mistakes and faulty actions due to possible, sometimes unjustified disciplinary punishment and negative effect of such information on the career ladder growth.

This requires for special research.

At the same time, high values of positive answers regarding the characteristic “Response to mistakes” obtained from the Ukrainian atomic nuclear power stations staff [15-16] is

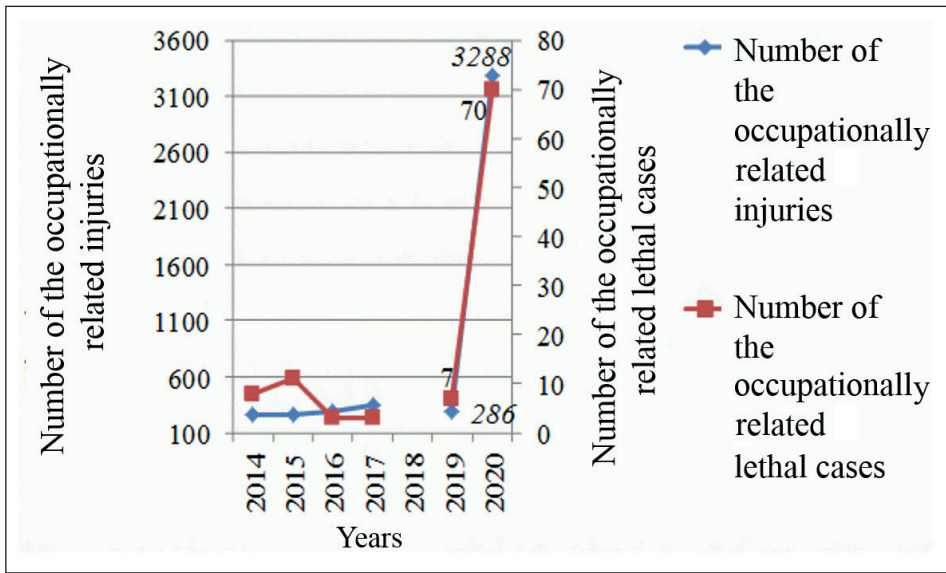


Fig. 1. Changes in healthcare and social services occupational injury rate (Ukraine, 2014 – 2020).

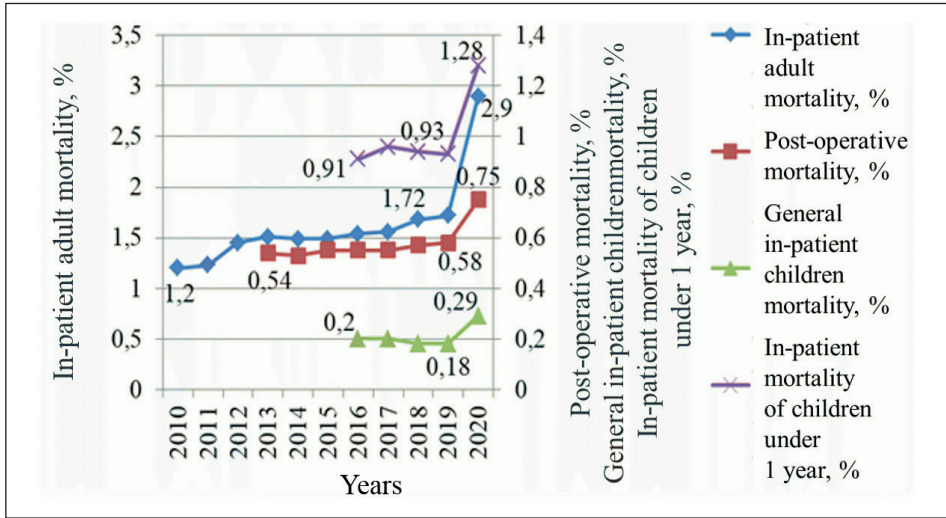


Fig. 2. Changes in the values of in-patient and post-operative adult and children mortality in healthcare institutions of Ukraine.

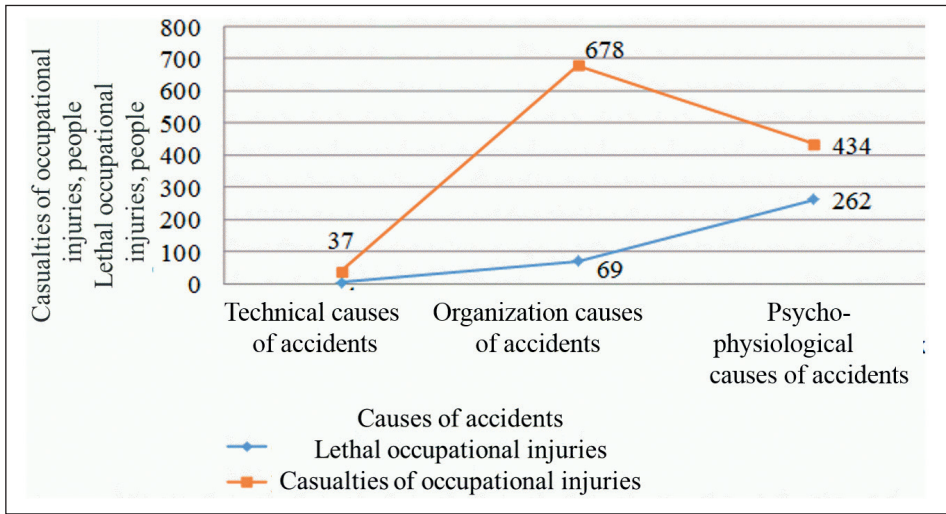


Fig. 3. Relation of the occupation injury rate to their causes in Ukrainian healthcare during the 2006-2018 period.

encouraging the thought that even in the Ukrainian healthcare system it is possible to shape appropriate attitude to the patients and medical staff safety. There are convincing evidences [18-19] that an appropriate safety culture in a medical

establishment cannot be shaped if various contingent layers (patients, staff) safety is provided via different programs. Another healthcare safety problem, observed both in Ukraine and in the world, is occupational injury rate, in-

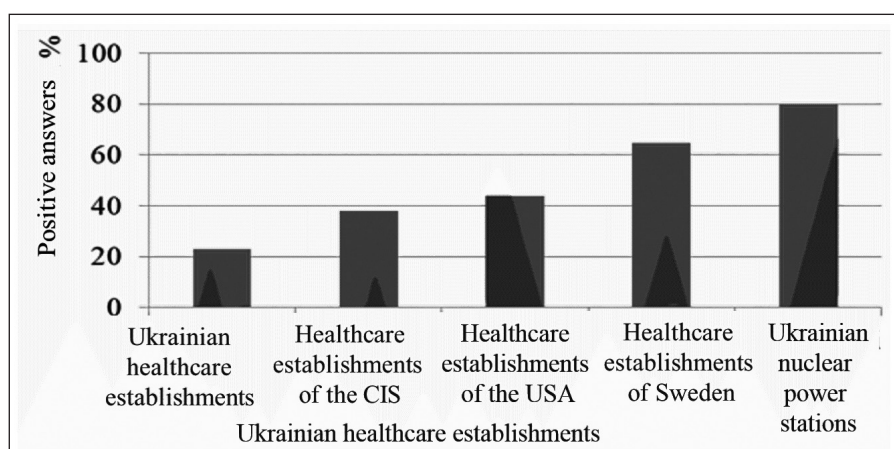


Fig. 4. Share of positive answers regarding the “response to mistakes” obtained from the Ukrainian and foreign healthcare establishments staff as well as the Ukrainian atomic nuclear power station personnel.

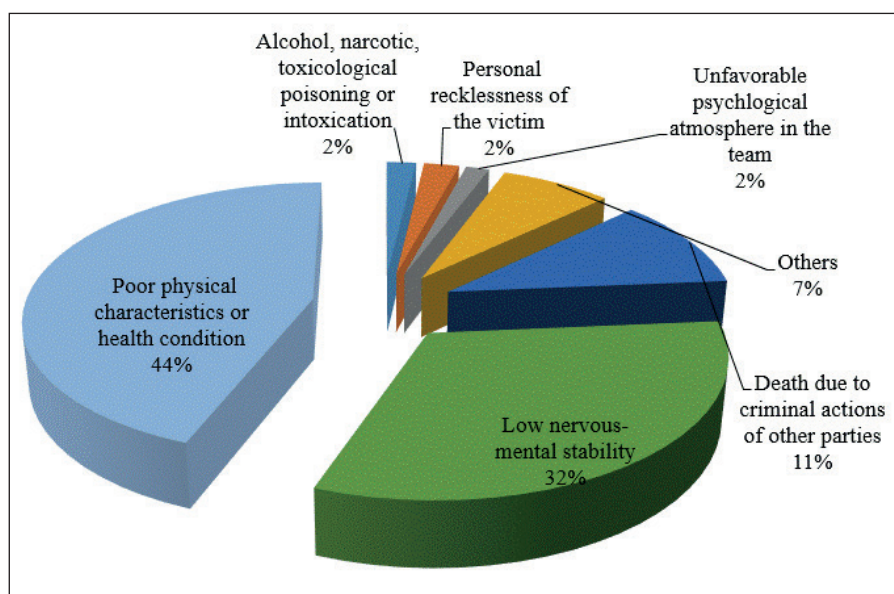


Fig. 5. Relation of occupational injury rate values by their causes in Ukrainian healthcare from 2006 till 2018.

cluding the lethal one, due to criminal actions of the third parties. In 2011 in Ukrainian healthcare establishments 10 medical workers were injured, which included 6 lethal cases. Generally, occupational injury rate due to criminal actions of the third parties takes up the third place among the psycho-physiologically-caused occupational injuries (Fig. 5). This problem has gained extreme importance under the COVID-19 pandemics [20]. Physical protection is another relevant issue, regarding high risk sources situated in hospitals (ionizing radiation sources, highly-toxic substances, strong narcotic medications, etc.).

During the pandemics, due to increase in medical wastes disposal, primarily disposable individual protection facilities, the healthcare establishments environmental problems have also exacerbated [21].

So, due to the conducted authors’ research and literature review, we have established that safety issues in the healthcare establishments refer to at least five basic aspects:

1. Patients’ safety;
2. Medical staff labour safety and hygiene;
3. Protection of the healthcare establishments risk sources, material assets, staff, patients under everyday conditions;

4. Healthcare establishments resilience to accidents in emergencies;

5. Environmental safety of healthcare establishments.

The authors suppose that the most significant factors of safe hospital environment, joining all five healthcare establishments’ safety aspects and providing for the favorable conditions implementation, are developing and preserving high level of the organization culture and its derivative, expressed as the safety culture in healthcare establishments.

Considering all the above-mentioned, safe hospital environment could be defined as the environment of highly organized culture, providing for the safety of the staff, patients, visitors and the surrounding environment under usual circumstances and emergencies, at the acceptable risk level.

The authors’ schematic vision of the safe hospital environment is shown in picture 6.

The development of such safe hospital environment is possible only under the common safety program implementation, the program including all components of the hospital environment safety. Such integrated approach would provide for the appropriate safety culture development.

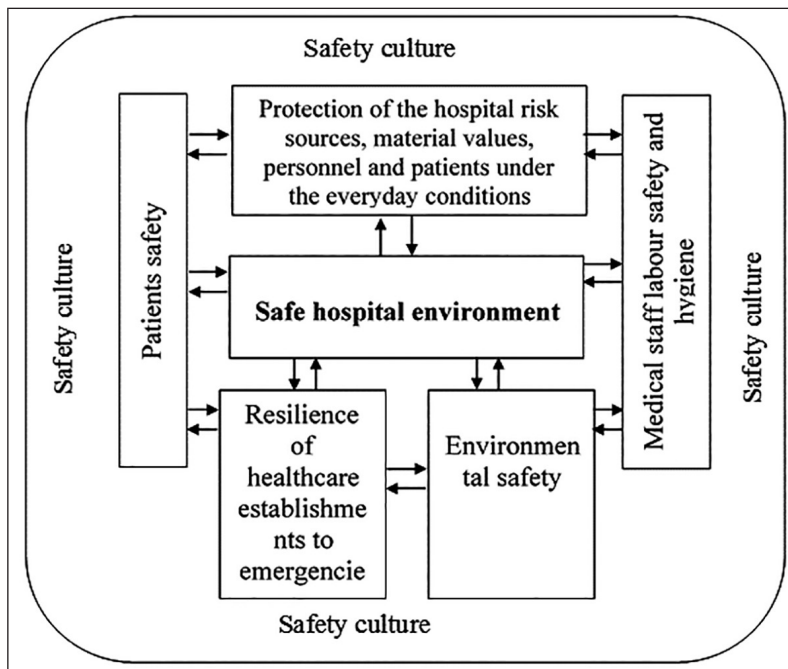


Fig. 6. Scheme of safe hospital environment – components and relation.

Though, transforming the notion “safe hospital environment” into an active instrument of healthcare institutions increased safety requires for more reasoned studies.

CONCLUSIONS

1. The COVID-19 pandemic has acted as a peculiar stress-test for identifying the problems of the hospitals safety and their interdependence.
2. A direct dependence between the occupational risks caused by COVID-19, medical staff values and patients safety values has been registered. The study has found low adherence of the healthcare establishments personnel to the patients’ safety issues.
3. Patients’ safety, medical staff labour safety and hygiene, medical staff resilience to emergencies and accidents, protection of the healthcare establishments risk sources, material values and patients under everyday conditions, as well as the environmental safety represent the hospital environment safety components.
4. The authors state that the safe hospital environment is the environment of highly organized culture, providing for the safety of the staff, patients, visitors and surrounding environment under the everyday conditions and in emergencies on the acceptable risk level.
5. The most significant factors of the safe hospital environment, joining all aspects of the healthcare establishments, and providing for favorable conditions of their implementation, are: shaping and preserving highly organized culture level as well as its derivative –safety culture in healthcare establishment.
6. The notion «safe hospital environment» should be present not only in the theoretical guidelines, but realized on practice, through the hospital safety measures, which requires for more substantial study, thus, serving active instrument of safe hospital environment.

7. The values which were studied by the authors may serve as indicators (stress- markers) used for assessment of the personnel and patients safety in the healthcare establishment.

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